REMARKS

The Official Action mailed February 13, 2003 has been received and its contents carefully noted. This Response is filed within 3 months of the mailing of the Official Action. Accordingly, Applicant respectfully submits that this response is being timely filed.

Applicants note with appreciation the consideration of the Information Disclosure Statements filed on April 26, 2001 and May 17, 2002.

Claims 1-15 are pending in the present application, of which claims 1-4 and 13-15 are independent. All claims have been amended herewith to more clearly recite the present invention. For the reasons set forth in detail below, all claims are believed to be in condition for allowance.

Paragraph 2 of the Official Action rejects claims 1-5, 7, 9, 11, and 13-14 as obvious based on the combination of U.S. Patent 5,773,325 to Teramoto, U.S. Patent 6,313,017 to Varhue, and U.S. Patent 6,221,766 to Wasserman.

As stated in MPEP § 2143-2143.01, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

Claims 1-4 and 13-14 have been amended to recite forming a thin oxide film on a surface of a semiconductor film (or a gate insulating film or base film) by applying water in which ozone is dissolved, and then etching the semiconductor film to remove the thin oxide film and contaminants. It is respectfully submitted that the prior art of record, whether taken alone or in combination, fails to disclose or suggest at least this feature of the present invention. Although it may be asserted that Lampert applies ozone, Lampert does not appear to disclose forming a thin oxide film and then removing the thin oxide film. Furthermore, neither Teramoto, Varhue, nor Wasserman teach or suggest removing the thin oxide film together with the contaminants. In view of the above, it is respectfully submitted that a *prima facie* case of obviousness cannot be maintained and favorable reconsideration is requested.

Paragraph 3 of the Official Action rejects claims 6, 8, 10, 12, and 15 as obvious based on the combination of Teramoto, Varhue, Wasserman and U.S. Patent 5,181,985 to Lampert. Claim 15, as well as claims 1-4, 8, 10, and 12-14 have been amended to recite that the water comprises ozone at a concentration of 6 mg/L or more (page 9, line 1). It is respectfully submitted that the prior art of record fails to disclose or suggest this feature of the present invention and favorable reconsideration is requested in view thereof.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend claims 1-15 as follows:

1. (Amended) A method for manufacturing a semiconductor device comprising:

the first step of forming a semiconductor film over a substrate;

the second step of forming a thin oxide film on a surface of the semiconductor film by applying water in which ozone is dissolved;

the [second] third step of etching the semiconductor film to remove the thin oxide film and contaminant impurities on [a surface of said] the surface of the semiconductor film by applying an etching solution while spinning the substrate; and

the [third] fourth step of forming a gate insulating film in contact with [said] the semiconductor film after [said second] the third step,

wherein [said second and third] the second to fourth steps are performed in sequence without being exposed to air.

2. (Amended) A method for manufacturing a semiconductor device comprising:

the first step of forming an amorphous semiconductor film over a substrate;

the second step of forming a crystalline semiconductor film by crystallizing [said] the amorphous semiconductor film;

the third step of forming an island-shaped crystalline semiconductor layer by patterning [said] the crystalline semiconductor film;

the fourth step of forming a thin oxide film on a surface of the island-shaped crystalline semiconductor layer by applying water in which ozone is dissolved;

the [fourth] fifth step of etching the [island-shaped] crystalline semiconductor layer to remove th thin oxide film and contaminant impurities on [a surface of said] the

surface of the crystalline semiconductor layer by applying an etching solution while spinning the substrate; and

the [fifth] sixth step of forming a gate insulating film in contact with [said] the crystalline semiconductor layer after [said fourth] the fifth step,

wherein said fourth [and fifth] to sixth steps are performed in sequence without being exposed to air.

3. (Amended) A method for manufacturing a semiconductor device comprising:

the first step of forming a base film over a substrate;

the second step of forming a thin oxide film on a surface of the base film by applying water in which ozone is dissolved;

the [second] third step of etching the base film to remove the thin oxide film and contaminant impurities on [a surface of said] the surface of the base film by applying an etching solution while spinning the substrate; and

the [third] fourth step of forming a semiconductor film in contact with [said] the base film after [said second] the third step,

wherein [said second and third] the second to fourth steps are performed in sequence without being exposed to air.

4. (Amended) A method for manufacturing a semiconductor device comprising:

a step of forming a gate insulating film over a substrate;

a step of forming a thin oxide film on the surface of the gate insulating film by applying water in which ozone is dissolved;

a step of etching the gate insulating film to remove the thin oxide film and contaminant impurities on [a surface of said] the surface of the gate insulating film by applying an etching solution while spinning the substrate; and

a step of forming a gate conductive film in contact with [said] the gate insulating film after [said contaminant impurities are removed] the step of etching,

wherein [said] the step of etching the gate insulating film [to remove said contaminant impurities] and [said] the step of forming [said] the gate conductive film are performed in sequence without being exposed to air.

5. (Amended) A method for manufacturing a semiconductor device according to claim 1, wherein [said surface is etched with an acid solution which includes fluorine in said second step] the etching solution comprises fluorine.

6. (Amended) A method for a semiconductor device according to claim 1, wherein [said surface is etched with an acid solution which includes fluorine after washing with pure water in which ozone is dissolved in said second step] the water comprises ozone at a concentration of 6 mg/L or more.

7. (Amended) A method for manufacturing a semiconductor device according to claim 2, wherein [said surface is etched with an acid solution which includes fluorine in said forth step] the etching solution comprises fluorine.

8. (Amended) A method for a semiconductor device according to claim 2, wherein [said surface is etched with an acid solution which includes fluorine after washing with pure water in which ozone is dissolved in said forth step] the water comprises ozone at a concentration of 6 mg/L or more.

9. (Amended) A method for manufacturing a semiconductor device according to claim 3, wherein [said surface is etched with an acid solution which includes fluorine in said second step] the etching solution comprises fluorine.

10. (Amended) A method for a semiconductor device according to claim 3, wherein [said surface is etched with an acid solution which includes fluorine after washing with pure water in which ozone is dissolved in said second step] the water comprises ozone at a concentration of 6 mg/L or more.

11. (Amended) A method for manufacturing a semiconductor device according to claim 4, wherein [said surface is etched with an acid solution which includes fluorine in said second step] the etching solution comprises fluorine.

12. (Amended) A method for a semiconductor device according to claim 4, wherein said surface is etched with an acid solution which includes fluorine after washing with pure water in which ozone is dissolved in said second step] the water comprises ozone at a concentration of 6 mg/L or more.

13. (Amended) A method for manufacturing a semiconductor device comprising:

forming a semiconductor film over a substrate;

[washing] forming a thin oxide film on a surface of the semiconductor film [with] by applying pure water in which ozone is dissolved;

etching the surface of the semiconductor film with an acid solution which includes fluorine to remove the thin oxide film and at least one of B, Na, K, Mg, and Ca by applying the acid solution while spinning the substrate; and

forming a gate insulating film in contact with [said] the semiconductor film.

14. (Amended) A method for manufacturing a semiconductor device comprising:

forming a base film over a substrate;

[washing] forming a thin oxide film on a surface of the base film [with] by applying pure water in which ozone is dissolved;

etching the surface of the base film with an acid solution which includes fluorine to remove the thin oxide film and at least one of B, Na, K, Mg, and Ca by applying the acid solution while spinning the substrate; and

forming a semiconductor film in contact with [said] the base film.

15. (Amended) A method for manufacturing a semiconductor devic comprising:

forming a gate insulating film over a substrate;

[washing] forming a thin oxide film on a surface of the gate insulating film [with] by applying pure water in which ozone is dissolved;

etching the surface of the gate insulating film with an acid solution which includes fluorine to remove the thin oxide film and at least one of B, Na, K, Mg, and Ca by applying the acid solution while spinning the substrate; and

forming a gate conductive film in contact with [said] the gate insulating film after [said] the contaminant impurities are removed.